



**Topic & Title of Project** BLM - Bodie Hills Conservation Action Planning

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**Date of Project** 2007 - 2009

## Background

In September 2007, the Bureau of Land Management's (BLM) Bishop Field Office entered into a cooperative agreement with The Nature Conservancy (TNC) to develop a Conservation Action Plan (CAP) for approximately 200,000 acres in California's Bodie Hills and northern Mono Basin (Fig. 1). The two organizations, and many other stakeholders, aimed to conserve and restore the Bodie Hills by protecting and enhancing its unique and important ecological integrity. The Bodie Hills project area is a largely unfragmented landscape that includes a diversity of Great Basin ecosystems. Other than remnant buildings in Bodie State Historic Park, this tract of land has no major development. Moreover, major fires and invasive species have not yet overtaken the dominant sagebrush ecosystems, as they have done elsewhere in the Great Basin. BLM is the primary federal steward of western shrub and grasslands. These intensely valuable ecosystems are under continuing pressure from both man-made and natural influences, making the BLM mission more and more difficult to attain. However, new resources are available to help the BLM achieve its goals and objectives related to the conservation and restoration of ecosystems. The CAP's purpose was to inform and guide the formulation of future site-specific vegetation management projects to protect and enhance the ecological integrity of the area.

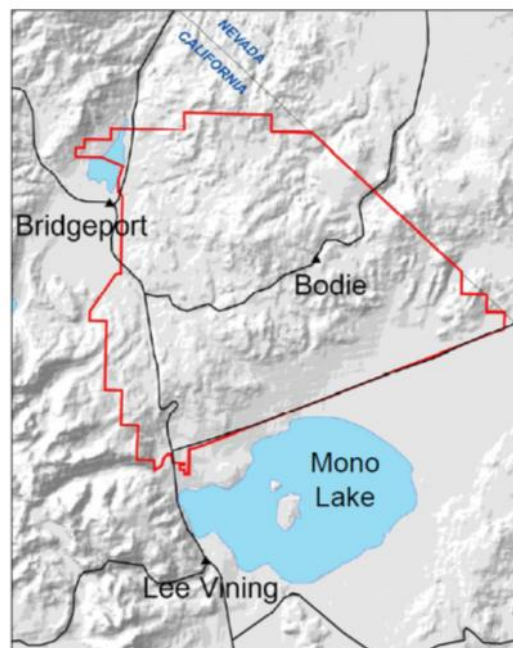


Figure 1. Conservation Action Plan Area outlined in red in California's Bodie Hills.

## Key Points

Products of the LANDFIRE project were critical to this planning process. LANDFIRE resources helped the BLM planning team assess current ecological conditions. Current conditions define the starting point for the plan, but it is then important to identify the most effective way forward---how do we get where we want to go in the shortest possible time in the most cost-effective manner. This important question was addressed using LANDFIRE Pre-European settlement vegetation models as the foundation. LANDFIRE models were reviewed and modified by BLM personnel and other stakeholders to reflect current conditions, management activities and costs. The team assessed the condition of each major ecological system by mapping Fire Regime Condition Class (FRCC) using the methodology developed under the U.S. Interagency Field Guide Book. Although called "fire regime" condition class, FRCC is actually an integrated, landscape-level measure of ecological condition. The FRCC metric incorporates species composition, vegetation structure, and all significant disturbances (not simply fire) for terrestrial and riparian ecological systems that would have occurred pre-settlement or in naturally functioning landscapes. This methodology determines the dissimilarity (called Fire Regime Condition or FRC) between an ecological system's current condition and its natural range of variability (NRV). NRV reflects the distribution of vegetation classes that would be found under naturally functioning ecological processes, as predicted by field studies, expert opinion and computer simulations.

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# LANDFIRE Data Product Applications



## Key Points, continued . . .

The CAP was developed using potential vegetation and current vegetation succession classes from LANDFIRE, however, the terminology for these classes was expanded. We used new remote sensing imagery combined with field plots, road observations, and Natural Resource Conservation Service (NRCS) soil survey information to enhance the predictive ecological models and develop cost-benefit assessments.

Three workshops were held with a diverse group of stakeholders (Ranchers, environmental groups, government staffs) during 2008 to review and refine the ecological models review findings, and identify potential future threats, vegetation management scenarios, and alternative conservation strategies factoring in cost and management urgency.

Modified LANDFIRE models created a framework for discussion among the stakeholders about what can and should be done to improve the ecological integrity of the Bodie Hills landscape. Stakeholders provided significant input to the analysis which turned up several findings regarding the degree of departure from the natural range of variability, probable causes of the departure, and future departure over the next two decades in the absence of thoughtful ecological management. Using this information, existing vegetation types, were assessed (Figure 2). Of these systems, eight of the ecological systems were targeted for management action. Various strategies were explored using computer simulations to test their effectiveness and return on investment evaluating potential management scenarios. One scenario was recommended for implementation. This scenario combined both the ecologically-based and wildfire protection management elements and met conservation and restoration objectives for the least cost for seven of the eight ecological systems. This project has demonstrated the value of collaborative learning, stakeholder input, and cost-benefit analysis using refinements to LANDFIRE products and new remote sensing.

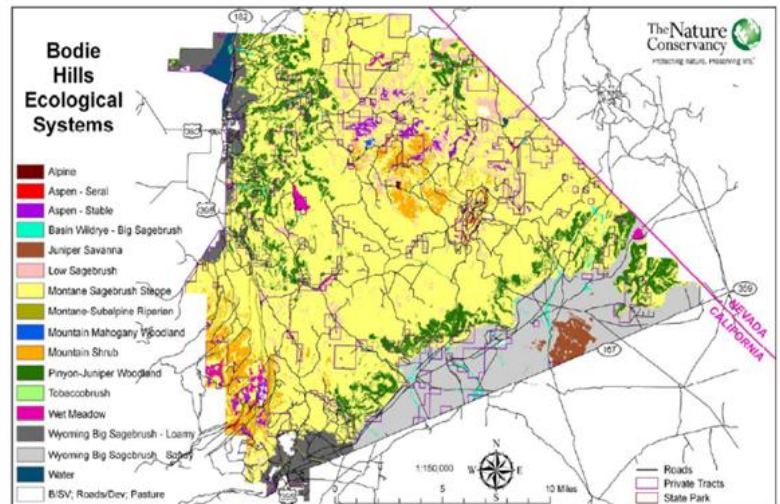


Figure 2. Bodie Hills Ecological Systems.

## Results:

- The state of the Bodie Hills ecological condition varies widely in terms of departure from the NRV. The primary cause of high departure is that the sagebrush systems are significantly lacking in the earliest successional classes and a portion is depleted of native grasses and forbs with some cheatgrass and conifer encroachment.
- Several ecological systems are predicted to become increasingly departed from NRV over the next 20 years in the absence of thoughtful active management. The following ecological systems were targeted by workshop participants for development of conservation strategies: montane sagebrush steppe, Wyoming big sagebrush (both sandy and loamy systems), low sagebrush, aspen woodland, montane subalpine riparian, wet meadows and basin wildrye-big sagebrush. Various management strategies using computer simulations to test their effectiveness and adjust the scale of application were explored for each targeted ecosystem.
- Combined ecologically-based and wildfire protection management scenarios meet the conservation and restoration objectives for the least cost on most of the ecological systems.

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## LANDFIRE Data Product Applications



### Results Continued:

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- The predicted climate change impacts generally have nominal effects for most systems over 20 to 50 years. The key factor explaining these results is that increased adverse effects of CO<sub>2</sub> enrichment (“fertilizer” for cheatgrass and conifers) are cancelled out by decreased soil moisture due to predicted increased droughts. For a few systems, drought increases the predicted mortality to shrubs and trees; and
- Return on investment analysis of various ecological systems showed many predicted ecological benefits per dollar invested in the recommended management scenario.

### Recommendations:

- Off-the-shelf LANDFIRE maps are fine for coarse-scale analysis; but at the Field Office or project level, finer scale data is valuable. Future improvement in LANDFIRE will be beneficial. The LANDFIRE reference models were revised to reflect new ecological knowledge and concepts. Local expert involvement is critical to making meaningful adjustments.
- The Uncharacteristic Classes should be expanded by LANDFIRE models as they are extremely important to managers because the restoration costs of different classes can vary by orders of magnitude.
- There is a real art to creating management scenarios for the vegetation types, but so often in the Great Basin the options for maintaining or improving given vegetation types is the same (Prescribed fire, herbicide, mowing, etc...). A library of management models could be built to facilitate this process.

### Additional Information:

For more information, see the following publications or reports:

- ♦ Provencher, L., G. Low, and S.L. Abele. 2009. Bodie Hills conservation action planning: final report to the Bureau of Land Management Bishop field office. The Nature Conservancy, Reno, NV.
- ♦ Low, G., L. Provencher, and S.L. Abele. 2010. Enhanced conservation action planning: Assessing landscape condition and predicting benefits of conservation strategies. *Journal of Conservation Planning* 6:36-60.
- ♦ Landscape Conservation Forecasting (formerly Enhanced-CAP) <http://bit.ly/go6Og5>



Please visit [www.landfire.gov](http://www.landfire.gov) for project details and LANDFIRE data products or communicate with the LANDFIRE team through the “Contact Us” link on the website’s homepage.